

U.S. Patent Application Serial No. 10/717,591
Amendment filed March 21, 2006
Reply to OA dated December 21, 2005

AMENDMENTS TO THE CLAIMS:

Claims 1 and 4-7 are being prosecuted in this application. Claims 2 and 3 have been cancelled. Claims 1 and 4-7 have been amended.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Currently Amended): An electronic parts packaging structure comprising:
a mounted body on which ~~[[an]]~~ electronic parts ~~[[is]]~~ are mounted;
the electronic parts having a connection pad; the electronic parts being mounted on the mounted body to direct the connection pad upward, the connection pad being~~which is constructed by constructed of~~ a laminated film ~~to have~~ having layers of film; the laminated film having an etching stopper film as an uppermost film; ~~and mounted on the mounted body to direct the connection pad upward;~~
an insulating film for covering the electronic parts;
a via hole formed at least in a predetermined portion of the insulating film on the connection pad of the electronic parts; and
a wiring pattern connected to the connection pad via the via hole,
wherein the etching stopper film functions as a stopper in case the via hole is formed by a laser, the etching stopper film being a member selected from a group consisting of a copper film, a gold film, a silver film, and a conductive paste film.

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Claim 2 (Cancelled): .

Claim 3 (Cancelled):.

Claim 4 (Currently Amended): ~~An~~ The electronic parts packaging structure according to claim 1, wherein the mounted body is a base substrate having a wiring pattern thereon or a structural body in which an insulating film and a wiring pattern are laminated by a predetermined number on the base substrate, and the wiring pattern connected to the connection pad is connected electrically to the wiring patterns under the electronic parts via via holes formed in the insulating films.

Claim 5 (Currently Amended): ~~An~~ The electronic parts packaging structure according to claim 4, wherein a plurality of electronic parts are packaged three-dimensionally in a state that the electronic parts are buried in a plurality of insulating films, and the plurality of electronic parts are connected mutually via the via holes formed in the insulating films and the wiring pattern.

Claim 6 (Currently Amended): ~~An~~ The electronic parts packaging structure according to claim 1, wherein a bump of an overlying electronic parts is mounted on the wiring pattern which is connected to the connection pad of the electronic parts by a flip-chip mounting.

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Claim 7 (Currently Amended): ~~An~~ The electronic parts packaging structure according to claim 1, wherein a thickness of the electronic parts is set to about 150 μm or less.

Claim 8 (Withdrawn): A method of manufacturing an electronic parts packaging structure comprising the steps of:

preparing an electronic parts, having a connection pad that is constructed by a laminated film to have an etching stopper film as an uppermost film;

mounting the electronic parts on a mounted body to direct the connection pad upward;

forming an insulating film to cover the electronic parts;

forming a via hole by etching at least a predetermined portion of the insulating film on the connection pad by a laser; and

forming a wiring pattern connected to the connection pad via the via hole.

Claim 9 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 8, wherein the etching stopper film is a member selected from the group consisting of a copper film, a gold film, a silver film and a conductive paste film.

Claim 10 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 8, wherein the connection pad is constructed by the laminated film selected from

a group consisting of aluminum film/nickel film/copper film, aluminum film/nickel film/gold film, aluminum film/nickel film/copper film/gold film, aluminum film/nickel film/silver film, aluminum film/chromium film/copper film, aluminum film/conductive paste film, aluminum film/titanium film/conductive paste film, aluminum film/chromium film/conductive paste film, and aluminum film/titanium film/copper film, which are formed sequentially from a bottom respectively, and an uppermost film of the connection pad functions as the etching stopper layer upon forming the via hole by the laser.

Claim 11 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 10, wherein the connection pad is formed of the aluminum film/nickel film/copper film, the aluminum film/nickel film/gold film, the aluminum film/nickel film/copper film/gold film, or the aluminum film/nickel film/silver film, and

the step of preparing the electronic parts includes the steps of,

forming selectively the nickel film on an aluminum pad of the semiconductor wafer having the aluminum pad by a electroless plating,

forming selectively the copper film, the gold film, the copper film/gold film, or the silver film on the nickel film by the electroless plating to form the connection pad,

reducing a thickness by grinding a back surface of the semiconductor wafer, and

dicing the semiconductor wafer to get the electronic parts.

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Claim 12 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 10, wherein the connection pad is formed of the aluminum film/chromium film/copper film, or the aluminum film/titanium film/copper film, and

the step of preparing the electronic parts includes the steps of,

forming sequentially the chromium film or the titanium film, and the copper film on a semiconductor wafer having an aluminum pad,

patterning the copper film, and the chromium film or the titanium film to leave the chromium film or the titanium film, and the copper film on the aluminum pad and to thereby form the connection pad,

reducing a thickness by grinding a back surface of the semiconductor wafer, and

dicing the semiconductor wafer to get the electronic parts.

Claim 13 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 10, wherein the connection pad is formed of the aluminum film/chromium film/copper film, or the aluminum film/titanium film/copper film, and

the step of preparing the electronic parts includes the steps of,

forming a resist film having an opening portion on an aluminum pad of a semiconductor wafer having the aluminum pad,

forming sequentially the chromium film or the titanium film, and the copper film on the resist film and the aluminum pad,

removing the resist film, and lifting off the chromium film or the titanium film, and the copper film on the resist film to leave selectively the chromium film or the titanium film, and the copper film on the aluminum pad and to thereby form the connection pad,

reducing a thickness by grinding a back surface of the semiconductor wafer, and
dicing the semiconductor wafer to get the electronic parts.

Claim 14 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 10, wherein the connection pad is formed of the aluminum film/chromium film/copper film, or the aluminum film/titanium film/copper film, and

the step of preparing the electronic parts includes the steps of,

forming sequentially the chromium film or the titanium film, and a first copper film on a semiconductor wafer having an aluminum pad,

forming a resist film having an opening portion on a portion on the first copper film, which corresponds to the aluminum pad,

forming a second copper film in the opening portion of the resist film by an electroplating, removing the resist film, and then etching the first copper film, and the chromium film or the titanium film by using the second copper film as a mask to thereby form the connection pad,

reducing a thickness by grinding a back surface of the semiconductor wafer, and
dicing the semiconductor wafer to get the electronic parts.

Claim 15 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 10, wherein the connection pad is formed of the aluminum film/conductive paste film, the aluminum film/titanium film/conductive paste film, or the aluminum film/chromium film/conductive paste film, and

the step of preparing the electronic parts includes the steps of,

forming the conductive paste film by coating selectively conductive paste material on an aluminum pad of a semiconductor wafer having the aluminum pad, or on the titanium film or the chromium film formed on the aluminum pad,

reducing a thickness by grinding a back surface of the semiconductor wafer, and

dicing the semiconductor wafer to get the electronic parts.

Claim 16 (Withdrawn): A method of manufacturing an electronic parts packaging structure according to claim 8, wherein the mounted body is a base substrate having a wiring pattern thereon or a structural body in which an insulating film and a wiring pattern are laminated by a predetermined number on the base substrate,

in the step of forming the via hole, the via hole is formed simultaneously in a predetermined portion of the insulating film on the wiring pattern under the electronic parts, and

in the step of forming the wiring pattern connected to the connection pad, the wiring pattern connected to the connection pad is formed to be connected electrically to the wiring pattern under the electronic parts via the via hole.